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DEVELOPMENT OF A PROCUREMENT TASK CLASSIFICATION SCHEME

by

Clark D. Fowler

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This thesis is an initial attempt to develop a procurement task classification scheme.

The paper begins with a theoretical framework highlighting current taxonomic issues and practices. The development of the 169 Federal Acquisition Institute/Acquisition Enhancement Study (ACE II) Program procurement task statements used in this paper is then reviewed. From the objectives of this study and the nature of the procurement task statements, criteria are developed to select an existing task classification scheme. The Berliner, Angell, and Shearer classification scheme was selected. An objective procedure was developed by the researcher to classify the behaviors of the procurement task statements in accordance with the Berliner classification scheme. The procedure, through use, was found to be almost entirely subjective. Due to the potential benefits of the procurement task classification scheme and activity

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Development of a Procurement Task Classification Scheme

by

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requirements for the degree of

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December 1987

ABSTRACT

This thesis is an initial attempt to develop a procurement task classification scheme.

The paper begins with a theoretical framework highlighting current taxonomic issues and practices. The development of the 169 Federal Acquisition Institute/Acquisition Enhancement Study (ACE II) Program procurement task statements used in this paper is then reviewed. From the objectives of this study and the nature of the procurement task statements, criteria are developed to select an existing task classification scheme. The Berliner, Angell, and Shearer classification scheme was selected. An objective procedure was developed by the researcher to classify the behaviors of the procurement task statements in accordance with the Berliner classification scheme. The procedure, through use, was found to be almost entirely subjective. Due to the potential benefits of the procurement task classification scheme and activity hierarchy, the researcher concludes that it is in the best interests of procurement personnel and the procurement process to continue taxonomic research to validate the procurement task classification scheme and activity hierarchy.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

I. INTRODUCTION

A. PROBLEM STATEMENT

The procurement process has been increasing in size and complexity over the past several decades. This growth has resulted in an increase in procurement research in an effort to understand the intricacies of the procurement process. One aspect of this research is the development of a classification system as an initial step in making procurement more of a "science" rather than just an "art." Of the several requirements which a subject matter must meet in order to be classified as a "science," the focus of this study will be on "the second requirement of science; namely, the description and classification of the subject matter" [Ref. 1:90].

Within a distinct subject matter, there can be numerous objects and as many ways to classify them which may be of benefit to the researcher. To date, there have been two taxonomies developed in attempts to organize objects within the procurement process. The first, "A Defense Systems Acquisition Management Taxonomy and Inventory of Official Acquisition Management Documents," developed a management document taxonomy "oriented toward the identification, storage, retrieval, and most importantly, the use of management knowledge in various acquisition situations throughout the life cycle of any complex defense system" [Ref. 2:A-2]. The second taxonomy, "A Proposed Definition and Taxonomy for Procurement Research in the

DOD," focused on the need "to clearly define procurement research and to classify its characteristics into a usable conceptual model" [Ref. 3:89]. Both taxonomies are process-oriented, i.e., categories of objects are arranged to coincide with the major phases of the procurement process.

However, using process-oriented taxonomies may not be the best way to describe and classify contracting subject matter.

> The taxonomy, because it is process-oriented, channels contracting thinking into a process-oriented direction. Perhaps it would be more beneficial to look at contracting subject matter from a different view or perspective. [Ref. 1:128-9]

Up to this point, taxonomic efforts have focused on inanimate objects within the procurement process. Key resources within any organizational process are the people who perform requisite tasks in order that the process function smoothly and organizational goals are achieved in an efficient and timely manner. These requisite tasks that are performed within the procurement process could be considered objects within the universe of contracting subject matter and, as such, a need exists to explore the possibility of behaviorally describing the procurement process by a classification scheme of requisite tasks performed by procurement personnel.

B. OBJECTIVES

The purpose of this thesis is to attempt to behaviorally describe the procurement process through a classification scheme of procurement tasks.

Specific objectives to be achieved in this study include:

1. The evolution of taxonomic thought and application in the biological and behavioral sciences.

2. Developing decision criteria for choosing an existing classification scheme.

3. The nature and possibilities of the results from applying the procurement tasks to the chosen classification scheme.

C. RESEARCH QUESTIONS

The following specific questions were addressed during this study.

Primary:

What taxonomical approach will provide a practical procurement task classification scheme?

Subsidiary:

1. What steps or procedures should be considered in developing a classification scheme for procurement tasks?

2. What procurement tasks are currently being performed?

3. What are the various characteristics of a procurement task?

4. What should be the decision criteria for classifying procurement tasks?

5. In what areas of procurement activity will this classification scheme be useful?

D. RESEARCH METHODOLOGY

The informational research methodology employed in this study was composed of three efforts: 1) an extensive literature review; 2) a verification of currently performed procurement tasks; and 3) the

development of a procedure to classify the procurement task behaviors in accordance with the selected task classification scheme.

The extensive literature review was conducted in the Naval Postgraduate School Library. Staff assistance was necessary in obtaining materials, vital to this study, from other university libraries. This review focused primarily on taxonomic efforts within the psychological field of human performance to classify tasks. From this review, taxonomic effort in other sciences was employed in this study. During this review, a number of task classification schemes were discovered. The decision criteria used in selecting the most appropriate task classification scheme for this study are described in Chapter III.

The verification of currently performed procurement tasks was completed through a telephone interview with Mr. Mike Miller of the Federal Acquisition Institute (FAI). The majority of procurement tasks used in this study were generated by FAI. The Acquisition Enhancement (ACE II) Study Group has subsequently added several more tasks to the FAI list which are also used in this study. Chapter III discusses in detail the relevant aspects of how these tasks were generated.

The steps taken to classify the procurement task behaviors in accordance with the selected task classification scheme are described in Chapter IV. This procedure was developed through the researcher's understanding of the major issues currently prevailing in taxonomic science. These issues were discovered during the literature review.

E. SCOPE, LIMITATIONS, AND ASSUMPTIONS

The scope of this study is focused on the application of a list of procurement tasks to an existing task classification scheme in an initial effort to behaviorally describe the procurement process. From this defined scope, taxonomic effort within the psychological field of human performance was focused upon since this is the predominant field in which classification of tasks is actively and scientifically pursued. This focus provided enough different task classification schemes from which to choose so that further search was unnecessary.

The following assumptions will apply:

1. The procurement process can be behaviorally described by a procurement task classification scheme.
2. All of the procurement tasks can be classified.
3. Given the purpose of this study, and the nature of the procurement tasks used in this study, an existing task classification scheme can be selected.

The following limitations will apply:

1. The procurement tasks are very broad in scope. As such, their classification will result in categories with a very broad descriptive nature.
2. The results of this research, due to the scope of the tasks and the education necessary to scientifically classify, should be viewed as a preliminary effort to classify procurement tasks.

F. LITERATURE REVIEW

Outside of the psychological field of human performance, there is very little information available on how to classify tasks. The primary work employed in this study was Taxonomies Of Human Performance: The Description of Human Tasks, by Edwin A. Fleishman and

Marilyn K. Quaintance. This book provided a complete overview of taxonomy and a detailed review of taxonomic work and task classification schemes within the human performance community. This book gave the researcher a basic understanding of taxonomic issues and criteria for evaluating and using a task classification scheme.

G. DEFINITIONS

The following definitions are key to understanding the concepts of the science of classification [Ref. 4:22]:

1. Classification: The ordering or arrangement of entities into groups or sets on the basis of their relationships, based on observable or inferred properties.

2. Classificatory system: The end result of the process of classification, generally, a set of categories or taxa.

3. Identification: The allocation or assignment of additional, unidentified objects to the correct class, once such classes have been established by prior classification.

4. Taxon (plural: taxa): A group or category in a classificatory system resulting from some explicit methodology.

5. Taxonomy: The theoretical study of systematic classifications including their bases, principles, procedures, and rules. The science of how to classify and identify.

For the purposes of this study, the following definition will be used [Ref. 5:49]:

Task: A specific unit of work performed by a single person that has an identifiable beginning and end.

H. ORGANIZATION OF STUDY

This study was undertaken in an effort to describe the procurement process through a classification scheme of procurement tasks. In Chapter II, taxonomic effort in biology and psychology is reviewed to identify key taxonomic issues and problems. The chapter concludes with a review of current taxonomic efforts within the psychological field of human performance to classify tasks. This chapter provides the theoretical foundation upon which the remainder of the study is developed.

In Chapter III, the procurement tasks are reviewed. The procurement tasks are followed by the decision criteria the researcher used to select the Berliner classification scheme. The chapter concludes with a description of the Berliner classification scheme.

Chapter IV brings the procurement tasks and the Berliner classification scheme together through a procedure developed by the researcher. The steps of this procedure are enumerated. Problems found in using this procedure are discussed. The overall results of this procedure are then briefly reviewed.

Chapter V analyzes two major results of the classification procedure. Statistics derived from the results indicate the possibility of an activity hierarchy. The potential benefits of the activity hierarchy are presented. An analysis of the second major result of the procedure, a proposed procurement task classification scheme, concludes the chapter.

Finally, Chapter V presents the conclusions and recommendations of the researcher regarding this research effort.

II. THEORETICAL FRAMEWORK

A. INTRODUCTION

A basic understanding of taxonomy should be required prior to embarking on any classification exercise. Knowledge of key taxonomic issues provides the researcher with the fundamental tools to either develop a scientifically sound classificatory system or choose from among existing classificatory systems. In this chapter, the science of classification and its role in biology and psychology is reviewed and key taxonomic issues and problems are identified. The chapter concludes with a review of recent taxonomic effort, within the psychological field of human performance, to classify tasks .

B. THE SCIENCE OF CLASSIFICATION

Although there is evidence that classification dates back to the cave dweller, the science of classification has its origin in ancient Greece. The theory of classification propounded by Plato and developed by Aristotle depended on the following assumptions [Ref. 4:19]:

1. a universal order exists in nature;
2. this order, when discovered, will permit carving nature into natural classes to yield a permanent conceptual framework that consists of a hierarchy of genus, species, and subspecies progressing downward from general to specific;
3. the principle of differentiation that operates throughout the hierarchy is derived from the similarities of the attributes or components (likeness or unlikeness) of the classified objects; and

4. the properties concerned partake of the substantive nature of the units being classified (or of their physical properties) and are not fortuitous.

Plato classified objects based on either their visible characteristics or some concept or idea. Aristotle began to classify objects based on their "essence," which was derived through logical procedures. Although Aristotle's essence-based classification method has not survived in modern times, his contribution has continued relevance in taxonomic issues.

> Aristotle's great attempt to build a system for seeing order in our world, the emphasis on taxonomy and types based on essence, led to a system of explanation fitting the syllogistic form that is now referred to as *Aristotelian*. [Ref. 4:20]

For example, "All mammals are warm-blooded (major premise); whales are mammals (minor premise); therefore, whales are warm-blooded (conclusion)" [Ref. 6].

When one thinks of taxonomies, the science which usually comes to mind is biology. A brief review of biological taxonomic practices will provide some insight into general taxonomic complexities and issues.

"At the most basic level biologists classify in an attempt to supply some order and organization to the vast number of living organisms which they observe" [Ref. 7:3]. There are three general types of biological classification: ecological, teleological, and theoretical.

Ecological classification "defines sets (or organisms) according to such criteria as the communities in which the organisms live ... or other environmental factors ..." [Ref. 8:26]. The choice of environmental factor to serve as the basis for this type of classification scheme is entirely at the discretion of the researcher. This type of

classification scheme does not tell the researcher anything about the organisms themselves.

Teleological classification is defined as [Ref. 8:26]:

> ... sets [of organisms] according to their usefulness or lack of it, usually with respect to man. Such sets might be, for example: domesticated animals, with meat animals, draft animals, pets, etc. as subsets; edible, non-edible, and poisonous fishes ...

This type of classification is usually of little scientific interest to biologists.

Theoretical classifications, the most widely used in biology, "define sets of organisms with respect to the attributes or characteristics of the organisms themselves" [Ref. 7:6]. There are three major schools of modern taxonomic thought within theoretical classification: Linnaean, Darwinian, and Numerical.

Linnaean taxonomy, based upon Aristotelian logic [Ref. 4:26],

> ... reduces the "how" of classification to an attempt to define the "essence" or "essential nature" of groups of organisms. Some unique set of characteristics is deemed necessary and sufficient (e.g., "breasts characterize mammals") for classification.

Due to its subjective nature, Linnaean taxonomy can "never serve as the basis for a scientific classification, mainly because of its inherent lack of empirical verification" [Ref. 4:26].

Darwinian taxonomy is based on the evolutionary theory of Charles Darwin which he introduced to the biological community in 1859.

> The major criticism of Darwinian taxonomy is that Darwinian theory, due to the small amount of data available (e.g., the fragmentary nature of the fossil record) is largely deductive. Consequently, the argument goes, Darwinian theory cannot provide a sufficient basis for classification. [Ref. 4:27]

Numerical taxonomy proponents hold [Ref. 4:27],

> ... that the relationships of contiguity and similarity should be sought by a quantitative analysis of the overall similarity of the organisms, based upon the widest possible range of physical and functional characteristics of the organisms themselves (e.g., morphological, genotypical, cytological).

The primary aims of this approach are repeatability and objectivity to insure that numerical taxonomy will not be subjective, as both the Linnaean and Darwinian taxonomies are criticized.

To achieve these aims, the numerical taxonomists offer the following axioms [Ref. 9:30]:

1. The ideal taxonomy is [one] in which the taxa have the greatest content of information, [being] based on as many characters as possible.

2. *A priori*, every character is of equal weight in creating natural taxa.

3. Overall similarity (or affinity) between any two entities is a function of the similarity of the many characters [on] which they are being compared.

4. Distinct taxa can be constructed because of diverse character correlations in the groups under study.

5. Taxonomy ... is, therefore, a strictly empirical science.

6. Affinity is estimated independently of phylogenetic considerations.

Emerging from the role of taxonomies in biology are three general issues: 1) For what purpose is the researcher attempting to classify objects into categories; 2) What descriptive base is the researcher using to differentiate the objects into their respective categories; and 3) What methodology is the researcher using to validate his classification scheme?

It is apparent from the role of taxonomies in biology that classification schemes are developed for many purposes and with many different descriptive bases to differentiate objects into categories. Purposes for which classification schemes are developed can be either utilitarian and specific or theoretical and general. Given the type of purpose, the researcher can proceed to define the descriptive base and choose a particular methodology. "In other words, the subject matter of the classification and the related classificatory procedures are dependent upon the purpose of the classification" [Ref. 7:26].

Given a purpose and an appropriate descriptive base to differentiate objects, it appears that the paramount problem with taxonomies in biology rests within the third issue mentioned, that is, the methodology used to validate the classification scheme. With the advent of numerical taxonomy, the traditional subjective Linnaean and Darwinian taxonomies are growing in disfavor, signalling an end to Aristotelian logic and the birth of quantitative analysis in the validation of classification schemes. The end result of this shift from subjective to quantitative validity is that classification schemes will have to be quantitatively proven in order to be recognized as valid by the scientific community.

An example of this shift is occurring in psychology, within the field of human learning. Up until the 1940s, there were seven "primitive" categories of human learning: conditioning, rote learning, short- and long-term memory, concept learning, probability learning, skill learning, and problem solving.

> These primitive categories are based on a sorting of learning processes into classes that have obvious differences at the descriptive level and they lean heavily on what may be called operational or quasi-operational criteria, and so may be called the classes of a primitive operational taxonomy. Once formed, these primitive operational categories undergo a variety of changes as the scientific analysis and understanding of the phenomena progresses. In short, a taxonomy reflects the stages of development of a science. [Ref. 10:328]

During this taxonomic development, a key discovery was made [Ref. 10:328]:

> ... that following the invention of laboratory tasks and procedures for the investigation of the first few of these primitive categories of human learning was recognition of a need to limit the generalization of empirical findings to a category, or even to a subclass of a category, until there was evidence to support a wider generalization.

After nearly 25 years of empirical effort, the results indicate that [Ref. 10:338]:

> ... the most useful set of prime categories in any contemporary taxonomy is the rather large set, and steadily increasing set, of subcategories of those primitive major categories.

Thus, it appears that this quantitative shift in taxonomic methodology is validating, in a slow and methodical fashion, parts of the categories originally arrived at by logical inference procedures.

C. CLASSIFICATION OF TASKS

The science which is most concerned with classification of tasks is psychology, in the field of human performance. Within the human performance community, a concerted effort has been made to derive a universal task taxonomy while keeping in mind the taxonomic lessons learned in both biology and its sister field, human learning, in psychology.

> One may properly speculate that the taxonomy of human performance implies a taxonomy of human learning processes, and vice versa. The reason is that it is unlikely that one can make an appropriate prediction or assessment of human performance capability, i.e., without considering the characteristics of the learning processes that produce that performance capability. [Ref. 10:327]

One taxonomic effort within the field of human performance deserves special attention and has provided much of the theoretical basis for this study. The effort is special because it "represents one of the few attempts to find ways to bridge the gap between basic research on human performance and the applications of that research to the real world of human decisions" [Ref. 4:10].

This effort, known as the Taxonomy Project (the Project), brought together scientists in such fields as "experimental psychology, differential psychology, industrial psychology (specifically job and task analysis), and human factors ... to provide a conceptual and methodological foundation ..." [Ref. 4:10] for a comprehensive review of human performance taxonomies. The Project's major objectives were:

1. Review of taxonomic efforts in other sciences, as well as in behavioral science.
2. Development of alternative taxonomic approaches based on various factors in task performance.
3. "Development of criteria and evaluative systems for testing the reliability, validity, and utility of the alternative approaches" [Ref. 4:11].

From the taxonomic efforts of biologists, the Project was quick to recognize that classification is both a process and a product. On the one hand, classification is a systematic process to arrange objects into

usable categories. On the other hand, classification as a product is the set of categories that result from the classification process.

> Emphasis is usually placed upon a discussion of alternative categories (products) rather than upon the systematic examination of the general principles and issues of the classification process. [Ref. 4:43]

The Project has made an attempt to reverse this emphasis within the human performance field.

Like taxonomic efforts in biology, the Project summarized that there were two major categories of purpose (utilitarian and theoretical) in developing a classification scheme. Of the two, existing task classificatory systems are based on utilitarian purposes, which indicates they are being developed for a specific reason or problem. The implication of researchers leaning in favor of utilitarian classifications is important.

> When a specific application is intended, it often dictates the classificatory structure from the start. This approach seems to be one of grouping tasks as a function of the effects of a selected set of variables on measures of task performance. Consequently, grouping of tasks can be achieved regardless of their intrinsic similarities and dissimilarities. On the other hand, in developing classification systems designed to satisfy a much broader range of applications, the approach is altogether different. Direct interest initially lies not in the similarity of effects upon task performance, but rather in the similarity of characteristics of the tasks themselves. This distinction is rarely made in present research practice. [Ref. 4:47-8]

In reviewing the bases of task classification, the Project focused on two issues. The first was on an appropriate definition of the concept "task," and the second was on the major approaches to use in task classification.

Task definitions have two dimensions: the breadth of coverage and whether the task is external or intrinsic to the performer. How broad in scope the task is described and whether or not the performer has some impact upon the task will dictate the type of approach a researcher can use. "In general, most investigators seemed to treat tasks as dynamic entities consisting of interrelated processes and activities" [Ref. 11:14].

Four major approaches to task classification have been identified within the field of human performance. Their titles and general descriptions are listed below [Ref. 12:44-5]:

1. Behavior Description—Classifying tasks in terms of overtly observed behaviors such as reading meters, throwing switches, and communicating. These are then grouped into broader categories.

2. Behavior Requirements—Emphasizes the inferred processes required to accomplish the task. The individual is assumed to possess a repertoire of processes or functions that intervene between the initiating stimulus and his responses.

3. Abilities Requirements—Similar to the behavioral requirements concept. Abilities, such as intelligence, are inferred attributes of individuals that underlie task performance. It is assumed that tasks require certain combinations of abilities if they are to be accomplished correctly. Abilities differ from behavior requirements in terms of concept derivation (stemming from factor analysis) and levels of description.

4. Task Characteristics—Assumes that the human activities representing performance are elicited by dimensions of the task such as the purpose or the performance criteria that must be met. These are apart from the operator and the behaviors he performs; they are in fact imposed on him.

Much of the remainder of the Project's effort was to evaluate many of the task classification systems within each of the four major

approaches. The premises that guided the evaluation of the systems included the following [Ref. 4:91]:

1. Descriptors, whether at the taxon level or some other level of description, should be defined as precisely and objectively as possible.
2. Descriptors should be applied reliably; that is, intra- and inter-individual agreement should be assessed in determining the adequacy of the system.
3. It should be feasible to actually apply the system to human tasks.
4. There should be some evidence of the validity of the system for its objectives.
5. Quantification of the descriptors is very desirable.

From this evaluative exercise, the Project concluded that much of the taxonomic effort within the field of human performance was primarily descriptive in nature. Finally, the Project established a linkage between data bases and taxonomic structures, continued work on certain taxonomies, and reviewed some taxonomic efforts in other fields of psychology.

An important by-product of the Project was a listing of some of the objectives and areas of practical application of task taxonomies.

1. Objectives
   a. Conducting literature reviews
   b. Establishing better bases for conducting and reporting research studies to facilitate their comparison.
   c. Standardizing laboratory methods for studying human performance.
   d. Generalizing research to new tasks.
   e. Assisting in theory development.
   f. Exposing gaps in knowledge.

2. Areas of Practical Application
   a. Job analysis.
   b. Man-machine systems design.
   c. Personnel selection.
   d. Training
   e. Performance measurement.
   f. Development of retrieval systems and data bases.

D. SUMMARY

This chapter has highlighted the general taxonomic issues and problems which currently prevail in developing classificatory systems. Within the psychological field of human performance, the Taxonomy Project, has focused on applying the lessons learned from biology to their field's taxonomic efforts to classify tasks. The next chapter looks at the tasks to be classified, the development and application of decision criteria to choose an existing task classificatory system, and an examination of the selected system.

III. SELECTING A TASK CLASSIFICATION SCHEME

A. INTRODUCTION

In the preceding chapter, key taxonomic issues were identified and the efforts of the psychological field of human performance to scientifically classify tasks were reviewed. Given this theoretical framework, this chapter focuses on the procurement tasks used in this study, the decision criteria formulated by the researcher to choose an existing task classification scheme, and a review of the selected task classification scheme.

B. THE PROCUREMENT TASKS

A total of 169 procurement task statements are used in this study. Of these 169 procurement tasks, 157 were developed by the Federal Acquisition Institute (FAI) [Ref. 13]. The remaining twelve tasks were provided by the Department of Defense Acquisition Enhancement (ACE II) Study Group [Ref. 14:2-C-2-17]. The appendix provides a listing of these procurement tasks.

These 169 procurement tasks have been determined by FAI and ACE II to be the most critical tasks performed by GS-1102 rated civilian personnel in executing the requirements of the procurement process. This determination of criticality is the result of efforts by the FAI during the period 1977-1985 and validated by ACE II in 1986.

During the period 1977-79, the FAI conducted a task analysis using a survey form developed by the U. S. Air Force Occupational Measurement Center.

> Tasks and background questions came from interviews with more than 130 individuals representing twenty departments and agencies. Additionally, a draft of the form was mailed to more than 200 Federal employees for review and comment. The development process was monitored and assisted by an interagency committee of subject-matter specialists and personnel representatives from various Federal agencies and the Civil Service Commission (now the Office of Personnel Management). The resulting form contained in excess of 300 items of personal and job related background data points and 1,480 tasks. [Ref. 15:1]

A key aspect of the form was that the majority of it dealt with the 1,480 tasks. "Each respondent was instructed to read all tasks, mark each task performed as part of his/her present position, and apply a nine point scale to rate the relative amount of time spent on each task performed" [Ref. 15:1].

In conducting the survey, the FAI used twenty-four federal agencies which administered it to "60% of their Contracts and Procurement Specialists (GS-1102), Purchasing Agents (GS-1105), and Industrial Specialists (GS-1150)" [Ref. 15:2]. Additional forms were distributed to agencies which had personnel spending more than half of their time on similar duties to those mentioned above.

> Of the 21,610 survey booklets sent to the field for administration, 14,082 (65.2%) were returned and used in the analysis. This return rate was considered very good relative to the success rates experienced by other organizations. Among the respondents: 8,134 Contract and Procurement Specialists (48% of the work force at that time), 1,578 Purchasing Agents, and 1,043 Industrial Specialists. In addition, questions were completed by 134 Engineers (GS 801), 147 Industrial Property Managers (GS 1103), 44 Quality Assurance Specialists (GS 1900), and 1,409 uniformed personnel. [Ref. 15:2]

The returned forms were analyzed by the Air Force Human Resources Laboratory. Using the Comprehensive Occupational Data Analysis Programs (CODAP), two major types of printouts were generated [Ref. 15:2]:

1. Data on designated groups of respondents (i.e., all members of the GS-1102 series, all supervisors, all contracting officers, etc.)

2. Data on computer generated groups of respondents. Using a cluster merger algorithm, the CODAP programs grouped persons doing like sets of tasks regardless of series, grade, title, agency, or other such background factors. Six major specializations emerged from the cluster merger diagram:
   a. Small Purchases.
   b. Contract Negotiator/Specialist.
   c. Contract Administration.
   d. Cost/Price Analysis.
   e. Staff Positions.

During the period 1980-1985, the FAI and the Office of Personnel Management (OPM) jointly refined the tasks into a manageable list which could be used for training purposes. Through small groups of subject matter experts, the FAI was able to crystallize its efforts into the following areas [Ref. 15:3]:

1. Define each career path (i.e., specialization).

2. Rate the training priority of tasks performed by more than 40% of the employees who comprise the career path.

3. Determine whether any task performed by less than 40% of the career path's present incumbents should nonetheless be covered in training.

4. Update the task inventory to reflect changes in policy.

5. Develop model "Curriculum Design Outlines" for the highest priority pricing tasks.

Given its training objective, the FAI used the prioritized tasks to develop Training Blueprints for each specialization and generate a codified procurement curriculum. Similarly, within the Department of Defense, ACE II has been tasked with improving the procurement work force. Part of the ACE II task is to develop curricula for [Ref. 14:31-32]:

> ... 13 mandatory functional courses. The courses include one entry and one intermediate level course in each of the following functions: contracting, industrial property management, purchasing, industrial specialist, and quality assurance.

ACE II has designated their contracting course as 1102 Series-Contracting.

> The Contracting Competency and task list is an accurate and total description of tasks performed in the Contracting career field. The initial list, provided by the Federal Acquisition Institute (FAI) through the efforts of the military and civilian agencies of the Federal Government, has been refined through the extended efforts of the DOD Defense Contracting/Acquisition Career Management Board (DC/ACMB), the Contracting/Acquisition course directors and instructors of contracting courses and small groups of other functional experts. [Ref. 14:2-C-1]

The end result of these efforts by FAI and ACE II was to identify the most critical tasks performed by procurement personnel and use these tasks as a starting point to design training curricula and, ultimately, to improve the overall efficiency of the procurement process.

As stated earlier in Chapter II, the definition of the concept "task" is an important issue when classifying tasks. The definition provided by the FAI is that "a task is measurable, it has a beginning and end, and all tasks are equally weighted" [Ref. 16]. This is similar to the definition of "task" identified in Chapter I, which bears

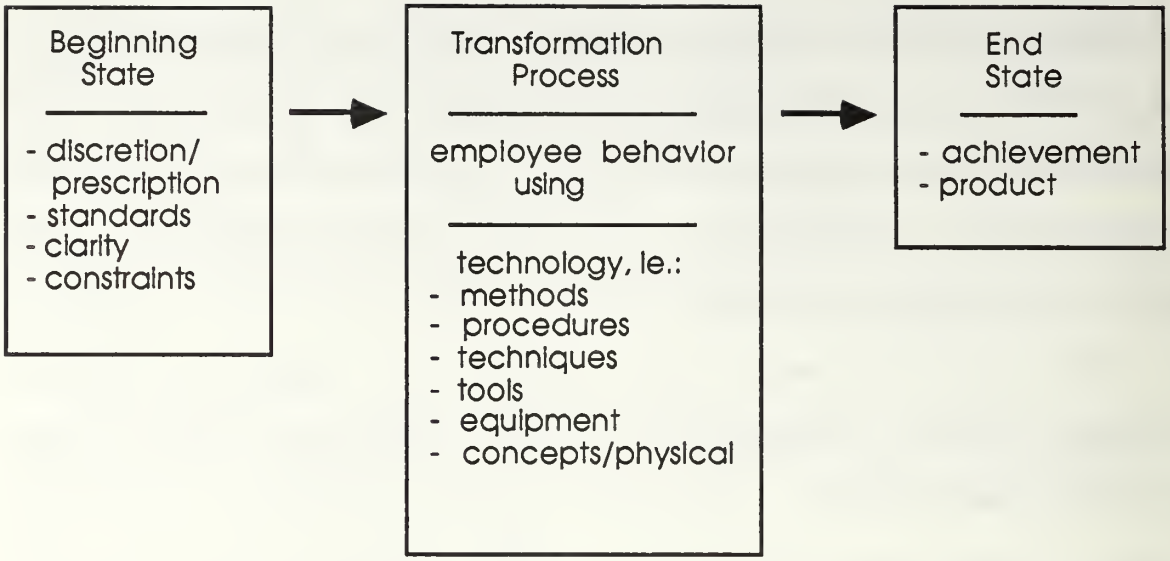
repeating. A task is a "specific unit of work performed by a single person that has an identifiable beginning and end" [Ref. 5:49]. And, "theoretically, the components of a task can be viewed as a transformation process brought about by an employee acting within the context of a technology" [Ref. 5:49].

There are four components to a task: 1) a beginning state; 2) employee actions; 3) technology; and 4) an ending state. A task works as follows [Ref. 17:49]:

> The task starts with the beginning state, which is characterized by varying degrees of discretion/prescription, standards, clarity, and constraints. Next, the transformation is carried out by means of employee actions, which involve the application of a technology. The technology includes all methods, procedures, techniques, tools, and equipment used by the employee, and can be conceptual as well as physical. The employee acts in order to produce an output or to achieve an impact. The achievement or production of the end state signifies the completion of the task.

Figure 3-1 is a graphical representation of the above textual description. Note how the component "employee action" has been replaced by "employee behavior" in Figure 3-1. This was done because the term "action" is a part of the definition of "behavior" [Ref. 18] and is a more precise term for this study.

An observation regarding Figure 3-1 is that all the components with the exception of "employee behavior" have two or more subcategories. This could imply that identifying subcategories of employee behavior is difficult.



Source: Author's graphical interpretation of text provided by Rowland, K. M. and Ferris, Gerald R., Research in Personnel and Human Resources Management, pg. 49.

Figure 3-1

Components of a Task

Given the components of a task discussed above and the procurement tasks listed in Appendix A, it is apparent that the procurement tasks are statements of employee behavior (action verbs) and end state product(s). No mention of the technology to be used by the employee or beginning state parameters to be aware of were either included or implied in each FAI/ACE II procurement task statement.

Employee behaviors in each of these procurement task statements were identified and underlined in the appendix. A major finding of this exercise is that, in the 169 procurement task statements, there are 258 separate instances of employee behaviors required. Many of the required behaviors are the same, but appear randomly throughout

the listing. An exercise in consolidating these repetitive behaviors yields 68 different behaviors. Thus, the 169 procurement task statements require 68 different behaviors to accomplish critical work required by the procurement process.

C. DECISION CRITERIA

The first decision in this study was to either develop a new classification scheme or use an existing one from the literature and modify it as necessary. After a review of the literature and a consideration of the time, education, and resources necessary to properly develop a classification scheme, the decision was made to use an existing task classification scheme.

The choice of an existing task classification scheme revolved around three criteria, the first two of which are the same as the first two taxonomic issues discussed in Chapter II. The three criteria considered were:

1. The primary objective of this study.
2. The characteristics of the procurement tasks.
3. The ease of use of the selected task classification scheme.

The primary objective of this study, to describe the procurement process through its tasks, implies that the classification scheme should be descriptive in nature. From the literature review, it became quickly apparent that no task classification exists which is designed to classify all of the tasks of a process. Therefore, the selected task

classification scheme had to be adaptable to the purpose of describing a process.

From the discussion earlier in the chapter, the procurement tasks used in this study were developed through a survey of nearly 50% of the GS-1102 procurement personnel in 1979. The main objective of this survey was to develop a set of task statements to be incorporated into a training curriculum. The fact was also identified that, of the four components of a task, only the employee behavior and the end state product components are identified in each FAI/ACE II task statement. The decision, therefore, was whether to classify the procurement tasks by employee behavior or end state product. Employee behavior was chosen because this component represents the active relationship between procurement personnel and the procurement process. The selected task classification scheme, therefore, had to be able to classify the behaviors of the procurement process.

The third criteria, the ease of use of the selected task classification scheme, was the most important criteria of the three. The literature review revealed that most of the task classification schemes were very specific in their application, highly technical, and targeted for a specific audience. It was the opinion of the researcher that a general, non-technical task classification scheme would best serve the primary objective of this study while providing subsequent readers an easily understandable and usable conceptual model.

Given these three criteria, the behavioral classification scheme developed by Berliner, Angell, and Shearer (hereafter referred to as

Berliner) in 1964 appears to meet all of the criteria and was selected for this study.

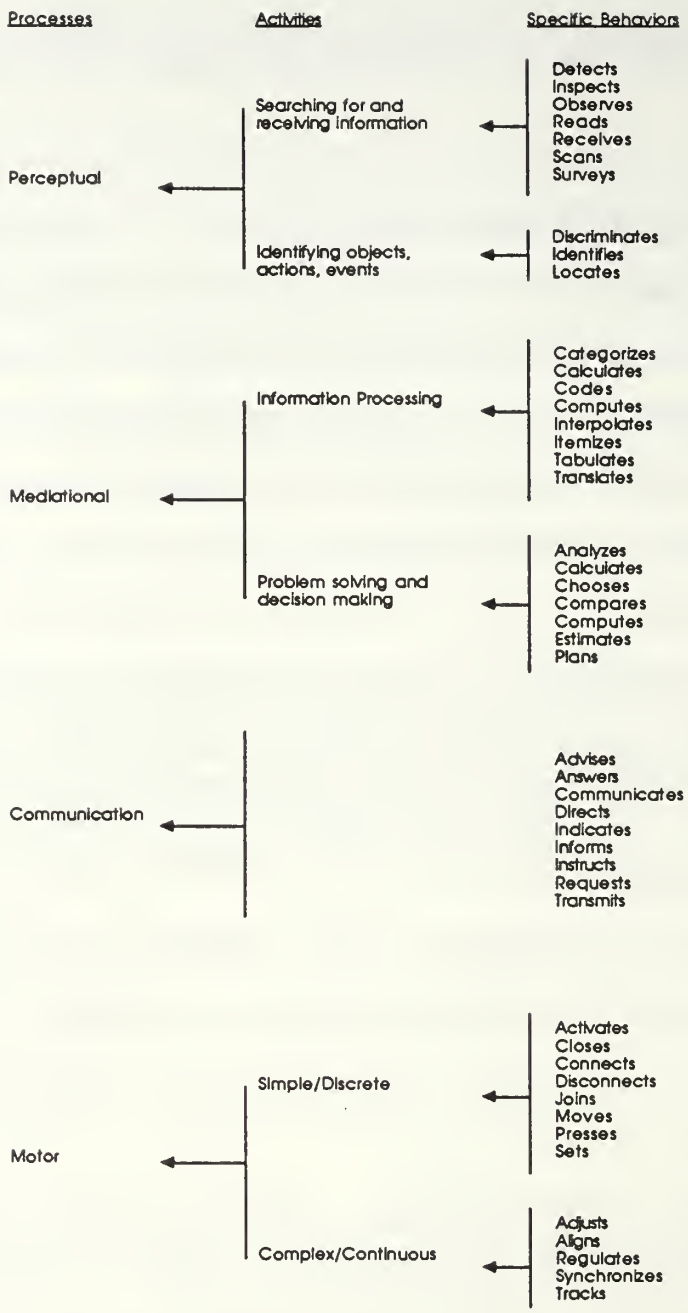
D. BERLINER CLASSIFICATION SCHEME

The Berliner classification scheme is shown in Figure 3-2. The objective of this classification scheme is to establish categories which "would be meaningful in selecting optimal methods of measuring performance" [Ref. 19:29]. This objective arose from the experience of Berliner that simulator training devices have the dual capability of training and evaluation.

> In the authors' experience, the second of these is largely neglected. In the course of a recent research contract, the authors found evidence that field engineers and training personnel who used simulators are usually unfamiliar with the proficiency-measurement capabilities of the devices, and that, more basically, they are unaware that performance evaluation is of any importance in the training process. [Ref. 20:277]

As can be seen from Figure 3-2, this classification scheme is "tripartite, with four major behavioral processes that break down into six functions, which in turn break down into a larger number of general tasks" [Ref. 12:45].

> The specific behaviors are the heart of the descriptive system. They are represented by action verbs which were felt would provide the widest understanding among the varied users of the scheme. The behaviors were selected in accordance with the general criteria of: a) being reliably identifiable, b) being simple acts with quantifiable properties, and c) being general in occurrence, i.e., involved in a variety of military jobs and missions. [Ref. 19:29]



Source: Berliner, C., Angell, D., and Shearer, J. W. Behaviors, measures and instruments for performance evaluation in simulated environment.

Figure 3-2

Classification of Behaviors

Since these behaviors are the heart of the system, it is important to understand the procedure used by Berliner in arriving at the verbs which are used in their classification scheme and the number of categories that encompass these verbs.

> Some 100 action verbs were collected, which represented activities involved in the performance of military-type tasks and missions. Persons of varying backgrounds and interests were asked to sort the verbs into various trial categories of behavioral processes. Categories were considered one at a time, without knowledge of the other categories. The behaviors were judged simply on whether they did or did not fit within the single category being considered. By making changes in the category designations, and by combining some of the categories and fractionizing some others, small improvements continued to be effected in the amount of agreement between different judges as to which specific behaviors fit which general categories. The best results, in terms of judges' agreement, were obtained finally with a system in which four major behavioral processes encompassed six broad types of activities, under which there were subsumed, in turn, some 50 specific behaviors. [Ref. 20:283]

A major shortcoming of this procedure is that the categories developed are not mutually exclusive, i.e., some of the verbs are in more than one category. However, Berliner questioned the need for this property in a classification scheme.

> R. B. Miller has pointed out (Miller, 1962) that mutual exclusiveness of terms in a taxonomy may in fact be an unattainable objective, and the findings of the present study provide no evidence to disconfirm this. Nevertheless, the system as it has been developed to this point does show that judges with rather diverse backgrounds and interests can agree quite well on whether or not a specific activity possesses characteristics which put it in a class of behaviors whose general nature is described by some broad behavioral-process designation. [Ref. 20:285]

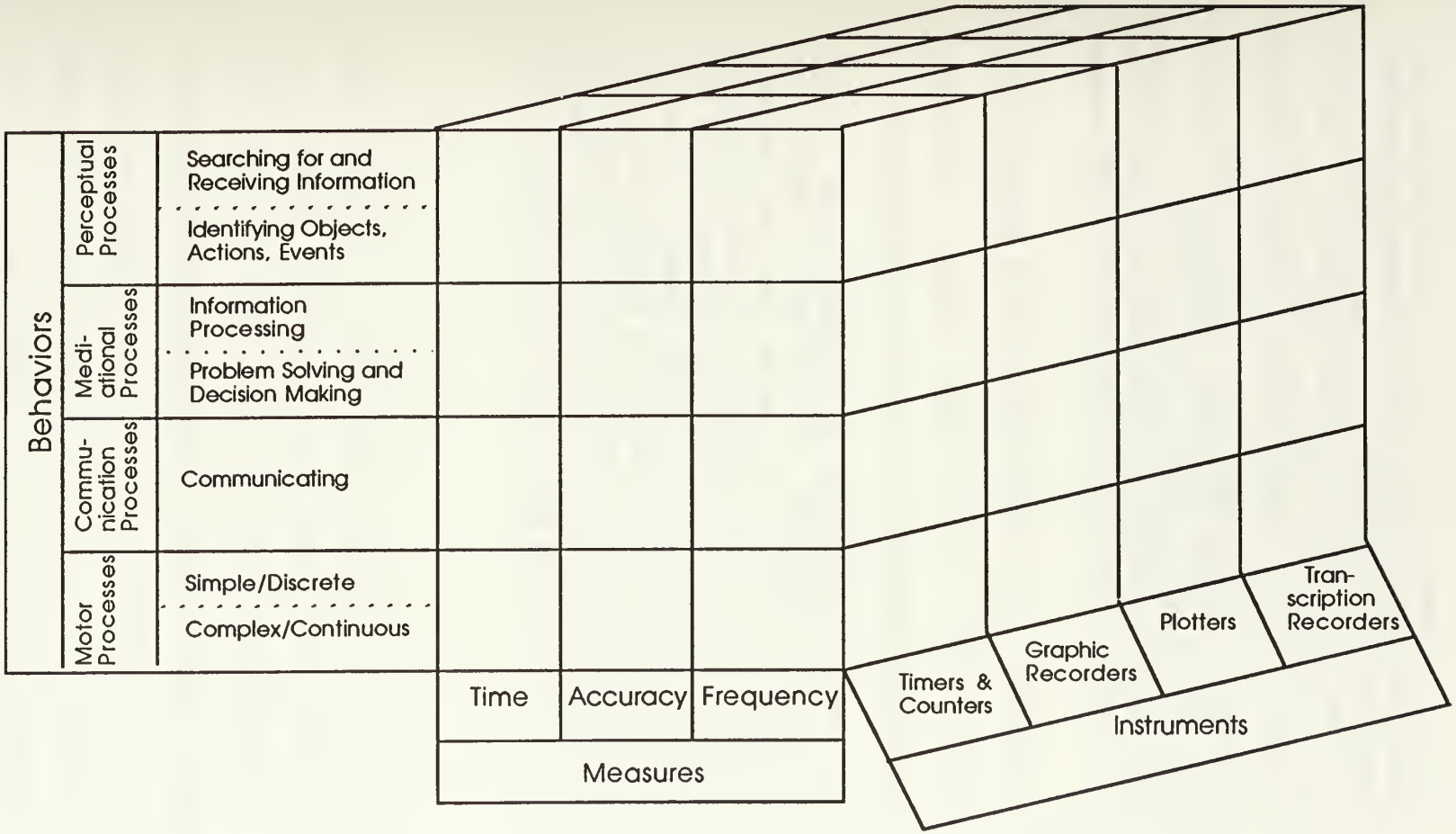
Another shortcoming of the classification scheme is that the 50 verbs used are not enough to adequately cover all of the behaviors which might be found in a job or process. Finally, none of the verbs,

activities, or processes are defined, which leaves definition of terms up to the user of the classification scheme. The end result of this classification scheme is that it can be a useful aid in performance evaluation and perhaps, due to its inherent vagueness with reference to the number of verbs that could be used and definition of terms, for other purposes which use tasks as the basis for classification.

The remainder of Berliner's effort was concerned with developing a three dimensional matrix which identified the relationships between behaviors, dimensions of behavior to be measured, and appropriate measurement devices. Figure 3-3 is a representation of this three dimensional matrix.

This three-dimensional matrix is outside the scope of this study, but the implication of this effort is that Berliner's task classification scheme can possibly be interfaced with other variables of interest in a variety of applications.

The review of literature reveals that the Berliner classification scheme has been used once in 1967 "in an effort to determine what operators do in complex systems" [Ref. 19:33]. The results of this effort were satisfactory, however, the authors made comments on improving rater reliability. More importantly, Berliner was selected among several alternatives.



Source: Berliner, C., Angell, D., and Shearer, J. W. Behaviors, measures and instruments for performance evaluation in simulated environment.

Figure 3-3. **Matrix of behaviors, measures, and instruments relevant to performance evaluation**

It was selected because it appeared to be relatively easy to use and reasonably comprehensive with respect to its coverage of specific behaviors. It also permits the analysis of raw data at various levels of detail; i.e., "process," "activity," and "specific behaviors." It had the additional virtue of having been recommended by Rabideau at the "Symposium and Workshop on Quantification of Human Behavior." Apparently, however, the technique has not as yet been used extensively to classify the activities of various operators. Further, since none of the data was gathered with this classification scheme in mind, it was applied with considerable difficulty in some cases and some activity data could not be made to fit this taxonomy at all. [Ref. 21:331-332]

As discussed in Chapter II, the Taxonomy Project assessed the quality of many different task classification schemes, including Berliner. The following is their assessment of Berliner [Ref. 4:96-97]:

In summary, in this "lexical" approach of Berliner *et al.* (1964), there are terms that are presumably related, via a hierarchical structure, to other terms; although the terms are not precisely defined, the scheme has utility. The simplicity of Berliner's scheme readily invites application. Frequent application, in turn, could lead to the standard usage of terms that is currently lacking. However, standardization in and of itself can provide only a limited amount of progress. It is not sufficient that everyone is using the same terms; the terms must have common meaning, and the structure in which they are embedded should be a valid and useful representation of the real world.

E. SUMMARY

In this chapter, the procurement tasks and the selected task classification scheme used in this study were reviewed. This review indicated that the procurement tasks were generated through task analysis for the purpose of generating a training curriculum and are incomplete with respect to the four basic components of a task. However, the employee behavior component is a common part of each task statement and was selected as the basis upon which the procurement tasks are classified.

After a review of three decision criteria formulated by the researcher for this study, the Berliner task classification scheme was selected to classify the procurement tasks. This selection was based on the general nature, range of possible application, and utility of the Berliner scheme, despite its lack of mutual exclusiveness, a limited number of verbs, and a lack of term definition.

IV. CLASSIFYING PROCUREMENT TASK BEHAVIORS

A. INTRODUCTION

In this chapter, the procurement task behaviors are classified in accordance with the Berliner classification scheme through a procedure developed by the researcher. Problems which occurred in using this procedure are discussed and evaluated. Finally, the overall results of this procedure are presented.

B. CLASSIFICATION PROCEDURE

The classification procedure was based on the following observations by the researcher:

1. Very few of the procurement task behaviors are the same as the behaviors used in the Berliner classification scheme.
2. Most of the procurement task behaviors appear to be synonyms of the behaviors in the Berliner scheme.
3. A few of the procurement task behaviors do not appear to readily fit into any of the Berliner activity categories, for example, "open" and "release."

Given the above observations, the following three step procedure was developed:

1. Identify and classify those procurement task behaviors which are identical to the Berliner behaviors.
2. Identify and classify those procurement task behaviors which are synonyms of the Berliner behaviors by using a thesaurus [Ref. 22]. To accomplish this step, the following "synonym procedure" was used:

a. Locate a Berliner behavior synonym in the thesaurus.

b. Compare the procurement behavior list to the Berliner behavior synonyms.

c. Put those procurement behaviors that match the Berliner behavior synonyms in the appropriate activity category.

d. Continue the above three steps for all of the Berliner behaviors.

3. Classify any remaining procurement task behaviors by the judgment of the researcher. Judgmental factors used by the researcher included, in order of importance:

   a. the context in which the procurement task behavior is used in the procurement task statements.

   b. the apparent similarity of the procurement task behavior to the other behaviors which had already been classified in Steps 1 and 2.

   c. the apparent "fit" of the procurement task behavior to the "essence" of an activity category.

C. PROBLEMS IN USING THE CLASSIFICATION PROCEDURE

The basic objective of this classification procedure was to attempt to eliminate as much researcher subjectivity in classifying the procurement task behaviors as possible. This objective is based on the observation from Chapter I that current taxonomic thought advocates an objective methodology instead of a subjective methodology.

Step 1 is the most objective step of the three in that the researcher did not exercise any judgment in classifying procurement task behaviors. The procurement task behavior was either the same or it was not the same as the Berliner behavior. In Step 2, by using a thesaurus to establish which procurement task behaviors were synonyms of Berliner behaviors, an objective source was used requiring very little, if any, judgment by the researcher. Only in Step 3 would

researcher judgment be required to classify the few remaining procurement task behaviors.

However, in performing Step 2, it became apparent that a significant amount of researcher subjectivity would be required to classify the procurement task behaviors. Two problems arose as a result of using this step.

In looking at the synonyms of the Berliner behaviors found in the thesaurus, it became evident that several of the synonyms did not fit into the same activity category in which the Berliner behavior was located. For example, synonyms for the Berliner behavior "direct" in the communicating category are "influence," "pilot," "point," "teach," "address," "govern," "manage," "command," and "advise" [Ref. 22:801-2]. The synonyms "govern," "manage," and "command" clearly imply a decision-making activity as well as a communicating activity. Therefore, these synonyms of "direct" have a multiplicity of use semantically.

Resolving this problem of multiplicity required a judgment by the researcher in choosing those synonyms which appeared to "fit" the "essence" of the Berliner activity category. For example, in the case of "direct," the researcher found that the synonym "advise" appeared to fit the best in the communicating activity category. It quickly became evident in using this solution that the majority of the procurement task behaviors would not be classified in Step 2. Therefore, due to this problem of multiplicity in Step 2, the classification procedure is almost entirely subjective in nature since the majority of the

procurement task behaviors would have to be classified in the highly subjective Step 3.

Resolution of this problem of multiplicity also pointed out another problem found in Step 2. Several of the Berliner behaviors in each activity category are synonyms of one another. In the searching for and receiving information category, the behaviors "observe" and "scan" are synonyms of "inspect." And in the communicating category, "inform" and "instruct" are synonyms of "advise" and "advise" is a synonym of "direct." In the communicating category, then, "inform" and "instruct" could logically be considered synonyms of "direct." From the discussion earlier, "inform" and "instruct" were not listed in the thesaurus as synonyms of "direct." Thus there exists more than one way in which to synonymously classify procurement behaviors. This multiplicity of method to synonymously classify behaviors increases the potential of a researcher to erroneously classify a behavior.

The highly subjective nature of these two problems—multiplicity of use semantically and multiplicity of method to synonymously classify behaviors—raises additional concerns as to the scientific validity of the Berliner scheme to classify behaviors. When these two problems are combined with the problems of a lack of mutual exclusiveness and a lack of definition discussed in the previous chapter, it becomes readily apparent that the Berliner scheme can best serve the researcher as a conceptual model and not as a true taxonomic model.

D. OVERALL RESULTS OF THE CLASSIFICATION PROCEDURE

Figure 4-1 is the overall result of this three step procedure. The first three columns of Figure 4-1 represent the three levels of Berliner (process, activity, behavior). The last three columns of Figure 4-1 represent, in order, the steps of the classification procedure.

An immediate observation from Figure 4-1 is that there are few procurement task behaviors which are the same as the Berliner behaviors. To quantify this observation, only 10 of the 68 procurement task behaviors (14.71%) are identical to Berliner behaviors. In terms of frequency, only 25 of 258 total behaviors (9.69%) are identical.

These low percentages may point to the fact that the Berliner classification scheme was designed for performance measurement while the procurement task statements were generated for use in designing training curricula. These low percentages validate a shortcoming of Berliner noted in the previous chapter that the 50 verbs used would not adequately cover all of the behaviors which could be found in a job or process.

These low percentages also pose the possibility that since a large percentage of the procurement task behaviors cannot be found directly in Berliner's performance measurement scheme, then a large number of the procurement behaviors would not be measurable. However, the procurement task statements could be reviewed and refined to improve their measurability. The results from Figure 4-1 could be used to establish those Berliner behaviors which are

Process	Activity	Berliner Behaviors	Step 1	Step 2	Step 3
Perceptual	Searching For & Receiving Information	Detect Inspect Observe Read Receive Scan Survey	Read (1) Receive (1)	Check (1)	Review (24) Monitor (3) Obtain (6)
	Identifying Objects, Actions & Events	Discriminate Identify Locate	Identify (4)	Screen (1)	Pursue (1)
Mediation	Information Processing	Categorize Calculate Code Compute Interpolate Itemize Tabulate Translate		Document (7) Record (1)	Assemble (1) Process (3) Prepare (21) Complete (1) Update (1) Adjust (1) Maintain (2) Include (1) Synopsize (2)
	Problem Solving & Decision Making	Analyze Calculate Choose Compare Compute Estimate	Analyze (6)	Apply (2)	Determine (35) Resolve (2) Reject (1) Select (1) Approve (10) Disapprove (2) Definitize (2) Make (1) Establish (2) Use (2)
	Problem Solving & Decision Making (cont'd)	Plan	Plan (1)	Assess (2) Evaluate (12) Take measures (3)	Perform (1) Execute (5) Procure (1)
Communicate	Communicating	Advise Answer Communicate Direct Indicate Inform Instruct Request Transmit	Advise (2) Communicate (1) Direct (1) Inform (1) Request (7)	Notify (5) Respond (1) Demand (1)	Participate (2) Debrief (1) Dispose (1) Justify (3) Coordinate (2) Authorize (1) Conduct (9) Consent (1) Grant (1) Order (1) Recommend (2) Distribute (1) Issue (14) Assist (1) Provide (2) Refer (2)

Note. ( ) frequency of each behavior used in the procurement task statements.

Source: Researcher's Analysis

Figure 4–1

Classification of Procurement Task Behaviors

synonyms or similar to the behaviors used in the procurement task statements. The procurement task statements could then be rewritten using the appropriate Berliner behavior.

Another observation from Figure 4-1 is that Step 2, due to the problems previously discussed, yielded only 11 synonyms of the Berliner behaviors which were also procurement task behaviors. These 11 synonym behaviors represent 16.18% of the 68 total procurement behaviors, and, in terms of frequency, 13.95%.

In Step 3, 61.76% of the total behaviors were classified. The most disturbing result of this step is that the top four behaviors ("determine," "review," "prepare," "issue"), in terms of frequency used in the procurement task statements, were classified by this step. These four behaviors account for 35.27% of the total frequency. This points to the fact that more than one-third of the behaviors in terms of frequency had to be subjectively assigned by the researcher, which implies a low degree of scientific validity in any quantitative analysis resulting from this procedure.

Five of the procurement task behaviors could not be classified using this procedure. These five behaviors are "negotiate," "develop," "release," "control," and "open." The most disturbing of these behaviors not being classified is "negotiate." "Negotiate" is used twelve times in the procurement task statements, which is a relatively high frequency when compared to the other procurement task behaviors.

In trying to classify these five behaviors, it became evident that two categories emerged which were different than the Berliner categories. "Negotiate" and "develop" could be classified as "creative" type behaviors. "Release," "control," and "open" could be classified as "motor" type behaviors. The combined frequency of "negotiate" and "develop" is 17 of 258 (6.59%), while for "release," "control," and "open" the frequency is 4 of 258 (1.55%).

It may be possible, due to its relatively high frequency, to consider the addition of the "creative" category to the five Berliner categories. It is also possible to consider this "creative" category a combination of Berliner categories. For example, "negotiate" invokes the image of someone both making decisions and communicating, while "develop" could involve processing a document while at the same time revising it based on information received. The implication of a category being composed of two or more categories suggests a hierarchy of activities and, therefore, behaviors.

The "motor" type behaviors could have been classified in the two motor process activity categories. However, it appeared to the researcher that this motor process is most properly used to categorize behaviors which have an interaction with a piece of equipment. The context in which these three "motor" type behaviors are used in the procurement task statements does not indicate the use of a piece of equipment. Thus, these three behaviors were not classified into a motor process activity category.

The absence of these three behaviors from Figure 4-1, due to their low frequency, should not have an adverse impact on any results which may be used to describe the procurement process. As discussed earlier, it is suggested that the procurement task statements which contain these behaviors be reviewed and either rewritten using a classifiable behavior or removed.

Finally, from Figure 4-1, statistics can be developed in terms of total behaviors and frequency of behaviors for each Berliner activity category. Additionally, it is possible to generate a procurement task classification scheme from Figure 4-1. These statistics and the procurement task classification scheme are analyzed in the next chapter.

E. SUMMARY

Through a three-step classification procedure developed by the author, all but five of the procurement task behaviors were classified by the Berliner classification scheme. Problems which occurred in using this procedure were presented and discussed. The overall results of this procedure were reviewed and discussed. In the next chapter, an analysis is conducted of the statistics and the procurement task classification scheme generated from the overall results of this classification procedure.

V. ANALYSIS OF THE RESULTS OF THE CLASSIFICATION PROCEDURE

A. INTRODUCTION

In the previous chapter, the overall results of the classification procedure were presented in Figure 4-1. A set of statistics and a procurement task classification scheme can be generated from Figure 4-1. Each of these are analyzed in this chapter. The focus of each analysis is on the practical value of the results in improving the quality of procurement personnel.

B. STATISTICAL ANALYSIS

TABLE 5-1

STATISTICAL SUMMARY OF FIGURE 4-1

Process	Activity	# of Behaviors	% of Behaviors	Frequency of Behaviors	% Frequency of Behaviors
Perceptual	Searching for & Receiving Information	6	9.52	36	15.19
	Identifying Objects, Actions & Events	3	4.76	6	2.53
Mediation	Information Processing	11	17.46	41	17.30
	Problem Solving & Decision Making	19	30.16	91	38.40
Communicate	Communicating	24	38.10	63	26.58
	Totals	63	100.00	237	100.00

Source: Researcher's Analysis

Through the previous classification procedure, 63 of the 68 behaviors in the procurement task statements were grouped into five activity categories. The statistics in Table 5-1 reveal that the distribution of the behaviors varies among the activities. The percentages in the last column indicate the relative presence of each activity in the procurement task statements. A by-product of the classification procedure is, therefore, an initial attempt in developing a relative hierarchy of the activities, as depicted in Table 5-2.

TABLE 5-2

HIERARCHY OF ACTIVITIES

Order	Activity	Frequency
1	Problem Solving & Decision Making	38.40
2	Communicating	26.58
3	Information Processing	17.30
4	Searching For & Receiving Information	15.19
5	Identifying Objects, Actions & Events	2.53

Source: Researcher's Analysis

The concept underlying this hierarchy is that the order of the activities, dictated by the distribution of frequency of procurement task behaviors, indicates their relative predominance in the

procurement task statements. Therefore, for this study, problem solving and decision making is more predominant than communicating, which is more predominant than information processing, which is more predominant than searching for and receiving information, and identifying objects, actions, and events is the least predominant of the five activities.

Such an activity hierarchy may have practical value as an analytical tool for procurement research. Consider the following statement by Dr. Stanley N. Sherman, a noted government procurement expert [Ref. 23:i]:

> The challenge to managers of procurement programs is as great as ever, but the complexity of decision-making and the impediments to creative action have increased rather than decreased for participants in the government's acquisition programs.

The statement implies that decision making is a key activity for procurement personnel. The activity hierarchy indicates that problem solving and decision making is indeed a key activity for procurement personnel. The activity hierarchy could be useful in validating the accuracy of such statements which occur in the procurement literature. A rigorous validation of procurement literature using the activity hierarchy could serve to expose inconsistencies in the literature.

This validation process may also uncover gaps of knowledge in the literature with respect to the behavioral activities of procurement personnel. Identification of gaps of knowledge in the literature should help in focusing future behavioral research efforts. Focusing upon

these identified gaps of knowledge should contribute to an effective use of research resources.

Now consider the following statements by Dr. Sherman concerning government procurement personnel [Ref. 23:383-386]:

1. Specific qualifications for appointment as contracting officers have never been delineated by the government. This has led to the absence of consistency in the ability of contracting personnel at all levels. While the procurement regulations mandate that persons be capable of sound judgement to be appointed, there is no operative standard for administration.

2. To date, little rigorous screening of applicants at the entry level and no priority for advanced educational achievement has been allowed.

3. Government procurement personnel are continually buffeted between competing objectives, often ones defined by their contemporaries, by the media, or by higher levels in the bureaucracy. It is part of the environment in which they live. They can attack this problem by becoming better communicators concerning their function in the management of their agencies.

These three statements reflect the need for improvement in the selection, training and communicative ability of procurement personnel.

The activity hierarchy could be useful in hiring new procurement personnel. The ideal objective of a personnel selection system is to hire an applicant with a high skill level in every activity. However, a properly designed screening instrument is necessary since most applicants possess differing levels of skill in each of the activities. Knowledge of the relative predominance of each activity would be helpful in properly designing the screening instrument.

To maintain continuity in the personnel system, the activity hierarchy would next be used in designing performance evaluation instruments. Personnel would be evaluated by their performance in each of the five activities. The performance evaluation instrument would, as a result of the activity hierarchy, "weight" the score of personnel in each activity to more accurately assess the quality of their performance. High scores of personnel in the more predominant activities would reflect their qualification for promotion to positions which require a high degree of skill in these activities.

The activity hierarchy could be used in the training community to emphasize and validate types of behavioral training programs required to improve or maintain the skills of procurement personnel. When designing behavioral training programs, appropriate amounts of time, number of topics to be covered, and degree of resource utilization for each activity can be effectively allocated based on knowledge of the importance of the activity to the trainee's job.

As mentioned earlier, it appears that a behavioral training program which is designed to improve the communication skills of procurement personnel is needed. The activity hierarchy could indicate to training professionals the extent of the importance of communicating to procurement personnel and assist in justifying the necessity to expend training resources to correct this deficiency.

The major drawback of the activity hierarchy is that it was derived through a subjective classification procedure, not by a rigorous, scientific methodology. The scientific validity of the hierarchy is very low.

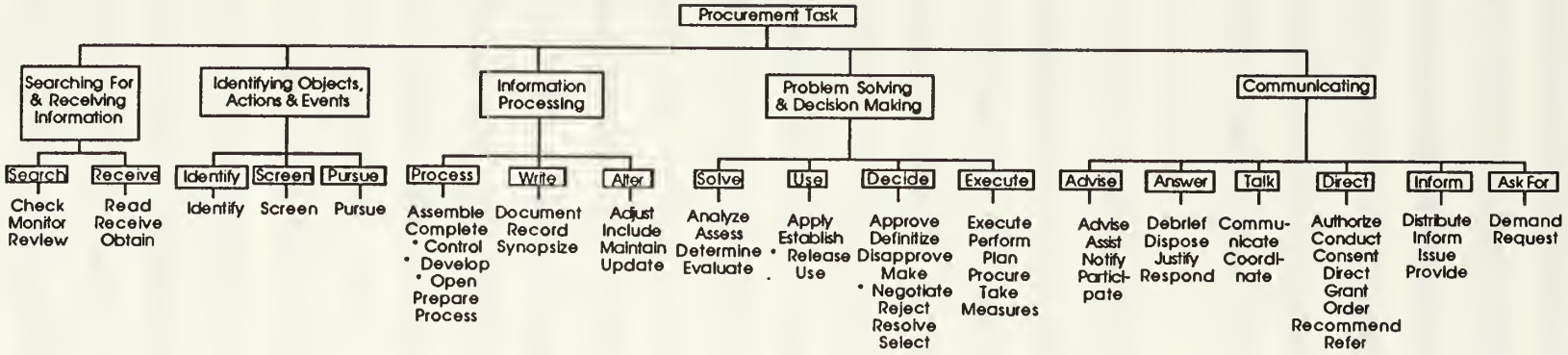
However, due to the tremendous potential of the hierarchy as discussed above, it is in the best interests of procurement professionals to continue taxonomic research on the tasks of procurement personnel and improve the scientific validity of this activity hierarchy concept.

C. A PROPOSED PROCUREMENT TASK CLASSIFICATION SCHEME

In addition to generating a set of statistics, the classification procedure of the previous chapter has served to both modify and improve the Berliner scheme for use in the procurement community. Figure 5-1 is the researcher's conception of an emergent procurement task classification scheme from the results embodied in Figure 4-1.

Through the classification procedure, it was found that only five of the seven Berliner activities were relevant in classifying procurement behaviors. The procurement scheme reflects these five relevant activities. The classification procedure also revealed to the researcher the existence of groups of behaviors within each activity.

It became evident to the researcher, in reviewing the results as they were arranged in Figure 4-1, that there were two or more logical groupings of the behaviors within each activity. The titles of each of these groups of behaviors represent the word which most "appropriately" describes their composite nature. The appropriateness of each title word is based on the judgment of the researcher.



Source: Researcher's Analysis

Figure 5-1. **Procurement Task Classification Scheme**

It is the opinion of the researcher that a concept underlying the Berliner scheme has been improved upon by this exercise. In the Berliner scheme, the underlying concept is that a behavioral process can be differentiated into distinguishable activities by grouping behaviors possessing a similar nature. The procurement scheme adds to this concept in differentiating five of these same activities by distinguishable groups of behaviors.

Finally, the procurement scheme has been used to classify the five procurement task behaviors which were not categorized in the previous classification procedure. Based on the nature of a behavioral group, the researcher subjectively identified those groups in which each of the five behaviors appeared to fit best given the behavior's contextual usage in the procurement task statement. The five behaviors in the procurement scheme classified in this manner are marked by an asterisk.

This exercise points to the use of the procurement scheme as an aid to the researcher in classifying behaviors used in future procurement task statements which are different than those behaviors currently being used. An implication of this use of the procurement scheme is that it is adaptable over time to the requirements of future researchers classifying procurement task behaviors. By being adaptable, the procurement scheme can maintain its usefulness.

The major utility of the procurement scheme, however, is to assist researchers in developing behaviorally accurate procurement task statements. As noted in Chapter III, a task is composed of four

components—beginning state, employee behavior, technology, and ending state. A complete task statement, therefore, is one which identifies the specific use of a variable from each component. For example, the task statement for this study could be: "At the researcher's discretion (beginning state), develop (behavior), using the Berliner model as a guide (technology), a procurement task classification scheme (end product)."

However, according to the activity (Information Processing) in which the behavior (develop) appears in the procurement scheme, this is not a very accurate task statement behaviorally. The reason the behavior is inappropriate is that, due to the researcher's experience, this task required much more problem solving and decision making instead of information processing.

In order to correct the task statement, a behavior should be used which appears in the most appropriate behavioral groups of the Problem Solving and Decision Making. In the researcher's judgment, the behavior "establish" appears to be the most appropriate. Therefore, the task statement would read: "At the researcher's discretion, establish, using the Berliner model as a guide, a procurement task classification scheme."

The key to developing an accurate procurement task statement is twofold. The first is that the person writing the procurement task statement must know from experience which activity is being performed by the person doing the task. The second is that the person writing the procurement task statement must use an appropriate

behavior to describe the activity. The procurement scheme is designed to assist a person writing procurement task statements on both counts.

An examination of the 169 procurement task statements used in this study reveal that the statements are not very well written, botj totally and behaviorally. The first problem of the statements was discussed in Chapter III (not containing a beginning state and technology component). This will permit a large degree of discretion for trainers who must design curricula to teach these statements. This large degree of discretion poses the probability that the task statements will be incorrectly taught, therefore wasting both trainers' and trainees' time, money, and effort.

Behaviorally, the procurement tasks should be reviewed and rewritten for a number of reasons. Each of the reasons and an example are presented below:

1. Some of the statements are redundant. For example, "Advise and assist requiring activities in developing and maintaining program plans, budgets, and schedules to reflect procurement lead times, market conditions, and procurement strategies." Advise and assist are both from the same activity (communicating) and behavior group (advise).

2. Some of the statements use behaviors from different activities. For example, "Request and evaluate pre-award surveys." Request is from the communicating activity, while evaluate is from the problem-solving and decision-making activity.

3. Some of the statements use an inappropriate behavior. For example, "Review proposals to identify terms and conditions requiring discussion." Review is found under the searching for and receiving information activity, while identify, the main thrust of the statement, is found under the identifying objects, actions, and events activity.

Rewriting those procurement tasks that contain one of the above deficiencies serves two important functions. The first is that the statements will be accurate from a behavioral point of view. The second is that, with a set of accurate procurement task statements, the procurement scheme can then be updated. Updating the procurement scheme serves to insure its accurateness when trying to validate the percent of each activity present in the procurement task statements.

In addition to revising the procurement task classification scheme, continuing research in developing a scientific methodology to classify behaviors is also necessary to fully validate the procurement scheme. A fully validated procurement scheme presents two important probabilities.

The first probability is that the activity hierarchy concept, presented in the previous section of this chapter, can become a fully operational analytical tool. As mentioned earlier, a valid activity hierarchy has a number of valuable uses within the training and personnel selection, evaluation, and qualification communities. The net impact of improvements in these communities, through using the activity hierarchy, will be a significant increase in the quality and effectiveness of procurement employees.

The second probability is that the procurement task classification scheme can serve as a valid task classification scheme for many of the other personnel specialties. As indicated in Chapter III, this procurement scheme was developed with behaviors from the most critical

tasks currently being performed by GS-1102s (Contract and Procurement Specialists). Using this procurement scheme as a guide, task classification schemes can be developed for GS-1105s (Purchasing Agents), GS-1150s (Industrial Specialists), and a number of other classes of government employees.

Transferring the procurement task classification scheme to other personnel specialties serves two purposes. The first is that other activity categories may be found, thus improving the breadth and quality of all of the task classification schemes. Building on the first purpose, the second purpose is that, over time, a set of appropriate standards in improving the quality and effectiveness of all government personnel specialities may emerge from the widespread use of this procurement scheme.

The primary objective of this study was to develop a task classification scheme which could be used in describing the behavioral aspect of the procurement process. The procurement task statements have attempted to identify the most critical pieces of work in the procurement process. The behaviors in these critical pieces of work have been classified in this study. From the resulting classification scheme, it appears that the procurement process requires from its personnel a variety of behaviors, each of which can be classified under one of five distinct activity categories.

Additionally, in achieving this primary objective, many practical benefits of the resulting task classification scheme have been discovered and discussed. The possible magnitude of these benefits is

enormous and, in the final analysis, the procurement task classification scheme, with additional study and use, will have a tremendous and positive impact on the procurement system.

D. SUMMARY

In this chapter, a two-part analysis of the results of the previous chapter's classification procedure has been conducted. In the first part, the statistical analysis revealed the possibility of an activity hierarchy. The potential benefit of using this hierarchy in procurement research and the selection, evaluation, qualification, and training of procurement personnel was discussed.

The second part of the analysis focused on the creation and possible benefits of a procurement task classification scheme. Among the benefits were evaluation and correction of procurement task statements, use as a model for other behavioral classificatory efforts, and behaviorally describing the procurement process.

The potential impact of these two results on the procurement process is tremendous. It is in the best interest of the procurement community to continue research to scientifically classify behaviors and validate the accuracy of the activity hierarchy and the procurement task classification scheme.

VI. CONCLUSIONS AND RECOMMENDATIONS

A. RESTATEMENT OF OBJECTIVES

The taxonomy of procurement tasks developed in this study was based on three taxonomic issues: 1) Why do you (the researcher) want to classify?; 2) What objects do you want to classify?; and 3) How are you going to classify?

The major objective of this study was to develop a procurement task classification scheme. With this scheme, it was hoped that generalizations could be made about the procurement process and future benefits for procurement personnel if such a scheme was adopted by the procurement community.

The objects used in this taxonomy were the behaviors found in the 169 FAI/ACE II procurement task statements used in this study. Part of this study's effort was ensuring that these 169 task statements encompassed all of the critical effort currently being performed by procurement personnel.

The decision of how to classify was reached by the researcher after a careful study of current taxonomic literature. Based on the literature review, the study's objective and the objects to be classified, the researcher developed criteria to select an existing task classification scheme to serve as a model classificatory system. The Berliner scheme was selected despite several noted shortcomings.

In using the Berliner scheme, the researcher tried to develop an objective procedure to classify the procurement task behaviors. The three-step classification procedure was to classify the behaviors by: 1) matching the Berliner behaviors with those procurement behaviors that were the same; 2) using a thesaurus as an objective guide to classify the majority of the procurement behaviors; and 3) using judgmental factors developed by the researcher to classify those few procurement behaviors which remained after steps one and two.

Two problems were encountered in using the thesaurus in Step 2. The two problems were that 1) several of the synonyms of a Berliner behavior found in the thesaurus did not fit into the same activity category in which the Berliner behavior was located, and 2) in using the thesaurus, there is more than one way in which to synonymously classify behaviors. Resolution of these two problems required judgment by the researcher in classifying a majority of the procurement behaviors. Also, these two problems, in addition to the earlier noted shortcomings, demonstrated that the Berliner scheme was most useful as a conceptual model rather than as a true taxonomic model.

The net effect of the two problems found in step two was to shift the majority of the classificatory effort to Step 3, which is the most subjective step of the three. This shift of the majority of the classificatory effort from Step 2 to Step 3 transformed the classification procedure from an objective procedure into a subjective procedure.

Based on this subjective procedure, all but five of the procurement behaviors were classified in accordance with Berliner. The results of the classification procedure yielded a procurement task classification scheme. Statistical analysis of the scheme indicated the possibility of an activity hierarchy. The implication of this hierarchy for use in procurement research, training and personnel selection, evaluation, and qualification was explored.

The procurement task classification scheme was first used to classify the five procurement behaviors not previously classified during the classification procedure. The procurement scheme was then used to demonstrate its use in behaviorally correcting the 169 FAI/ACE II procurement task statements. Possible use of the procurement scheme as a behavioral model for other personnel specialties was then discussed. Finally, the procurement scheme was used to develop a tentative behavioral description of the procurement process.

B. CONCLUSIONS

Based on this study's development, several overall conclusions can be presented.

1. A Procurement Task Classification Scheme Can Be Developed.

Three tools were necessary to develop the procurement task classification scheme in this study. These three tools were: 1) a basic understanding of task taxonomic science; 2) an existing task classification scheme; and 3) a classification procedure.

The work of the Taxonomy Project, found in Taxonomies of Human Performance: The Description of Human Tasks by E. A. Fleishman and M. K. Quaintance, provided a very good basic understanding of taxonomic issues, how they apply in classifying tasks, and current methodologies being used in the psychological field of human performance to develop task classification schemes.

While reviewing this work, the researcher was able to develop a set of criteria to select an existing task classification scheme. The Berliner scheme was selected because it met the following criteria: 1) it was a descriptive type of classification scheme; 2) it classified behaviors; and 3) it was easy to use and understand.

Given an understanding of taxonomic issues and the Berliner scheme as a model, the researcher developed a classification procedure to objectively classify the 68 behaviors found within the 169 FAI/ACE II procurement task statements. However, problems found in using the classification procedure resulted in the procedure being subjective rather than objective. In spite of this subjectivity, the procedure did produce a procurement task classification scheme, which, upon further analysis, is practical and possesses a number of potentially valuable benefits for the procurement community.

2. The Procurement Task Statements Are Incomplete.

Through the concept of "task" used in this study, a task has four components: beginning state, employee behavior, technology, and ending state. The FAI/ACE II procurement task statements identify the employee behavior and ending state only. The importance of the

other two components is currently unknown, but an endeavor to write complete task statements may reveal valuable knowledge on the cause-and-effect relationships among the four components and improve the effectiveness of procurement personnel development.

3. **Some of the Procurement Task Statements Are Behaviorally Inaccurate.**

When several of the procurement task statements were evaluated by using the procurement task classification scheme, three types of behavioral deficiencies surfaced. The first deficiency is that some of the statements are redundant in using two behaviors in the task statement which are classified in the same activity category of the procurement task classification scheme.

The second deficiency is that some of the statements use two behaviors in the same task statement which are classified in different activity categories of the procurement task classification scheme. The third deficiency is that some of the statements use an inappropriate behavior in a task statement to describe the actual activity required by the task statement.

The sum effect of these deficiencies indicate that personnel writing the statements need training in using behavioral descriptors which accurately reflect the type of activity required by a procurement task. This may be a semantic exercise, however, the use of common behavioral descriptors by both personnel writing the task statements and downstream professionals using these statements will insure the

development of a common behavioral language and a common understanding of the activities behind these descriptors.

4. **The Berliner Classification Scheme Is Not Comprehensive.**

The Berliner scheme, developed as a performance measurement tool, was selected based on the decision criteria developed by the researcher. Berliner was not without its shortcomings. These shortcomings were a lack of mutual exclusivity of its categories in classifying behaviors, a lack of term definition, and use of only 50 behaviors. This last shortcoming was important in that a classification procedure had to be developed by the researcher to classify many of the procurement task behaviors which were not identical to the Berliner behaviors.

In using the classification procedure, it was noted that synonyms of the Berliner behaviors could belong in other categories as well as the one in which the Berliner behavior was located. It was also noted that there was more than one way to synonymously classify procurement behaviors. To resolve these two problems, the researcher had to use judgment to classify many of the procurement behaviors based on their apparent "fit" to the "essence" of the category. The classification procedure further reinforced the Berliner scheme's shortcomings of a lack of mutual exclusiveness and term definition.

Despite these shortcomings, a procurement task classification scheme was developed based on the Berliner model. Berliner is a useful model for classifying behaviors. However, some work is necessary to make the Berliner scheme comprehensive. Defining the

processes, activities and behaviors in detail will help to ensure mutual exclusiveness of the activity categories. These definitions should help future researchers to objectively classify their sets of behaviors.

5. **A Procurement Task Classification Scheme Is Beneficial For Purposes of Recruitment, Training, Performance Evaluation, and Promotion.**

A valid procurement task classification scheme has the potential to vastly improve the quality of procurement personnel. This improvement begins with writing behaviorally accurate task statements. Accurate task statements will help generate an accurate activity hierarchy. An accurate activity hierarchy has a number of positive impacts on the selection, evaluation, qualification, and training of procurement personnel. An accurate activity hierarchy may also be a useful tool for personnel conducting behavioral research.

The sum of these impacts is a coordinated and cohesive approach by all personnel-related activities. This coordinated and cohesive approach can contribute heavily to the requirement of an austere budgetary climate to use fiscal resources in the most effective manner possible.

C. RECOMMENDATIONS

The following recommendations are suggested to continue the momentum generated in this study.

1. **The Procurement Task Classification Scheme Developed In This Study Be Applied and Further Refined.**

The procurement task classification scheme developed in this study is an initial attempt to order the numerous behaviors found in the 169 FAI/ACE II GS-1102 task statements into a conceptual model which can be easily used by personnel professionals throughout the procurement community. A key word in the primary research question of this study was "practical."

Liberal application of the procurement task classification scheme, throughout the procurement community, serves three purposes. First, it will help to identify areas of the scheme for further refinement as it is applied to the various aspects of GS-1102 personnel development. Second, as the scheme is found useful in various applications, use of the scheme may spread to other procurement specialties personnel development programs. Third, benefits which may be derived from using the procurement task classification scheme can be realized much sooner than if the procurement community waits until the "perfect" classification scheme is developed by the research community.

2. **Additional Research Be Accomplished to Develop a "Scientific" Method of Classifying Behaviors.**

The future of the procurement task classification scheme presented in this study rests in the development of a scientific method to classify all of the behaviors found in the procurement task statements. Through this scientific methodology, groups of behaviors will emerge which represent the "universal" relationships among the

behaviors. This scientific methodology will probably change the appearance of the procurement task classification scheme, however, the new classification scheme will possess all of the potential benefits of the old scheme and the added attribute of being scientifically valid.

A potential benefit of developing a scientific methodology to classify behaviors is that the methodology, with some modification, may be useful in classifying other groups of objects within the procurement body of knowledge. The long-range effect of this benefit will be to discover "universal" relationships between all groups of objects within the procurement body of knowledge. These "universal" relationships may prove useful in defining the procurement body of knowledge and, ultimately, in improving the overall quality of the procurement process.

3. **Complete and Accurate Procurement Task Statements Using the Four Components of a Task Should Be Developed.**

Current training programs are built upon the behaviors and end products of these procurement task statements. It is quite possible that training programs, built upon knowledge of all four components of a task (beginning state, employee behavior, technology, ending state) would be quite different and perhaps more effective than current training programs. This possibility, plus the amount of error found in the procurement task statements in behaviorally describing an employee's activity, strongly suggest that the procurement task statements be rewritten.

This additional research, with complete and accurate procurement task statements, could parallel this study in developing classification schemes for the other three task components (beginning state, technology, ending state). An analysis of all four task component classification schemes may yield a number of interrelationships which may prove beneficial in further improving the effectiveness of training and other personnel improvement programs.

D. SUMMARY

This chapter began with a brief review of the flow and highlights of this study. Major conclusions from the study and recommendations for continuing the momentum generated by the study were then presented and discussed.

This study represents an initial effort to employ current taxonomic theory and practice in classifying the behavioral components of 169 FAI/ACE II procurement task statements currently being performed by GS-1102s. The major shortcoming of this study was the researcher's inability to develop an objective classification procedure.

The primary value of this study was to identify a number of potential uses of the procurement task classification scheme and its statistical by-product, the activity hierarchy, to improve the quality of procurement personnel. It is in the best interest of procurement personnel and the procurement process to continue taxonomic research to realize the benefits of a scientifically valid procurement task classification scheme.

APPENDIX

LIST OF PROCUREMENT TASKS

Underlined words are the specific behaviors used in applying the procurement tasks to the Berliner classification scheme.

Federal Acquisition Institute Procurement Tasks [Ref. 13]:

1. Advise and assist requiring activities in developing and maintaining program plans, budgets, and schedules to reflect procurement lead times, market conditions, and procurement strategies.

2. Develop (with representatives of the requiring activities), maintain, and update acquisition plans.

3. Determine that purchase requests from the requiring activities are sufficient for the procurement.

4. Review technical requirements, statements of work, or specifications submitted by the requiring activity.

5. Resolve requests to purchase personal services; determine the need for and request wage rates and determinations from the Department of Labor.

6. Review technical evaluation criteria.

7. Prepare source selection plans.

8. Determine the timing and source of funds for the procurement.

9. Screen mandatory sources of supply (e.g., QPLs, FSS, ADP/T Schedules, Handicapped and Prison Industries); develop source lists (e.g., solicitation mailing lists).

10. Conduct market research.

11. Determine whether other than full and open competition is justified.

12. Prepare justifications for other than full and open competition, where required.

13. Process unsolicited proposals.

14. Determine whether the procurement will be a small business or labor surplus set-aside.

15. Determine if offerors are qualified for set-asides.

16. Procure supplies or services through 8(a) procedures.

17. Determine and document the method of procurement.

18. Analyze purchase vs. lease alternatives.

19. Select and, where required, justify type of contract.

20. Determine and justify the necessity for contractor financing arrangements (i.e., progress payments, advance payments, loan guarantees, and long-lead financing).

21. Establish opening/closing dates.

22. Determine mandatory and optional provisions and contract clauses to include or reference in the solicitation.

23. Determine the need and develop special provisions and contract clauses for the solicitation.

24. Complete and issue RFQs, IFBs, and RFPs.

25. Synopsize proposed procurements.

26. Document reasons for not synopsizing proposed procurements.

27. Document reasons for reducing the required solicitation period.

28. Evaluate and respond to inquiries concerning solicitations.

29. Prepare and conduct conferences to clarify solicitations (pre-bid/pre-proposal conferences).

30. Prepare or issue amendments to solicitations.

31. Determine and justify necessity of time extensions for submission of bids or proposals.

32. Prepare cancellations of solicitations before or after opening; if necessary, prepare determinations for cancellation.

33. Receive and control bids.

34. Open and read bids.

35. Request time extensions from contractors of bid expiration dates.

36. Determine the allowability of late bids (and also proposals).

37. Dispose of late bids (and also proposals).

38. Prepare abstracts of bids.

39. Determine the lowest total price bid and whether the lowest price is fair and reasonable.

40. Determine responsiveness of lowest bidders.

41. Identify suspected mistakes.

42. Request verification of offers, calling attention to suspected mistakes.

43. Determine allowability of mistakes in offers.

44. Process mistakes in offers.

45. Request and evaluate pre-award surveys.

46. Review the list of debarred, suspended, and ineligible contractors.

47. Determine and document responsibility of proposed contractors (including Certificates of Competency).

48. Open and record proposals.

49. Review proposals to identify terms and conditions requiring discussion.

50. Provide guidance to technical evaluators for review of technical proposals.

51. Analyze technical evaluation reviews or memoranda.

52. Determine the necessity for and obtain certificates of current cost or pricing data.

53. Determine need for, request, and review audit reports; resolve questions on audits with auditors.

54. Analyze price proposals.

55. Analyze proposed elements of cost to develop prenegotiation positions (ranges) on major elements of cost.

56. Conduct/participate in fact-finding sessions with representatives of proposed offerors.

57. Establish the competitive range.

58. Develop negotiation objectives, strategies, and tactics; document in prenegotiation memoranda.

59. Conduct prenegotiation meetings with government personnel.

60. Conduct negotiation sessions with offerors in competitive range.

61. Conduct negotiation sessions in sole source procurements.

62. Conduct negotiation sessions for post-award agreements.

63. Request best and final offers.

64. Make or recommend the final source selection decision or reject all offers.

65. Prepare price negotiation memoranda (including a determination of the fairness and reasonableness of the proposed price).

66. Determine and document the necessity of a letter contract.

67. Prepare letter contracts.

68. Definitize letter contracts.

69. Prepare and review contracts.

70. Obtain approvals for awarding of contract.

71. Execute contract and notify successful offeror(s).

72. Notify unsuccessful offerors.

73. Issue notices of awards of contracts.

74. Synopsize awards.

75. Document reasons for not synopsizing awards.

76. Debrief unsuccessful offerors.

77. Evaluate protests and prepare administrative reports (findings and recommendations) on protests before or after award.

78. Notify GAO of intent to proceed with procurement or award in emergency situations.

79. Determine necessity for, plan, and conduct post-award orientation conferences.

80. Provide continuing advice to contractors on terms and conditions of the contract.

81. Inform contractors of the names, roles, responsibilities, and limits of technical representatives.

82. Develop contract administration plans and milestones; advise technical representatives of their roles, responsibilities, and limits.

83. Review and evaluate reports from representatives of the contracting officer.

84. Monitor and maintain control of contracting officer representatives.

85. Communicate with legal, quality assurance, financial, supply management, property management, the requiring activity, and other support staff.

86. Issue, negotiate, and definitize orders against basic ordering agreements.

87. Issue orders against contracts.

88. Review options and determine whether to exercise them; prepare determinations and findings or justifications for exercise of options.

89. Coordinate with requiring activities on statements of work or specifications for changes or modifications.

90. Evaluate requests/proposals for changes in contracts or subcontracts.

91. Negotiate and issue changes or modifications to contracts.

92. Issue administrative (no-cost) changes.

93. Prepare or process and execute novation and change of name agreements.

94. Analyze and negotiate contractors' value engineering change and engineering change proposals.

95. Evaluate contractors' progress towards meeting delivery and performance requirements.

96. Prepare contract status reports.

97. Review and obtain corrections to inspection and acceptance reports.

98. Identify breaches of contract (i.e., failure to comply with contract provisions).

99. Determine whether delays are excusable and grant performance time extensions for excusable delays.

100. Determine need, prepare, and issue stop or resume work orders.

101. Notify contractors of delinquencies or quality deficiencies.

102. Determine and assess liquidated damages.

103. Negotiate considerations for delinquent deliveries or items not meeting specifications.

104. Determine need, prepare, and issue cure notices.

105. Evaluate adequacy of contractor's responses to cure notices.

106. Determine, prepare, and issue show cause notices.

107. Identify and pursue available remedies in warranty, guarantee, or latent defect cases.

108. Determine need to terminate contracts for convenience.

109. Issue convenience termination notices and take measures to protect the government's interests.

110. Negotiate and execute contractual documents for settlement of partial and complete contract terminations for convenience.

111. Negotiate, review, and approve no-cost cancellations of contracts.

112. Determine need to terminate contracts for default.

113. Negotiate settlement of contract terminations for default.

114. Issue or distribute default termination notices and take measures to protect the government's interests and mitigate damages (including recovery of re-procurement costs).

115. Review limitation of cost or funds clause.

116. Evaluate or adjust contract funds requirements.

117. Release excess funds under limitation of costs clause.

118. Review/approve contractor's invoices and vouchers for payment.

119. Obtain corrections of improperly prepared invoices or vouchers.

120. Monitor the processing of contractor's invoices and vouchers to expedite payment under the Prompt Payment Act.

121. Direct the suspension or disapproval of unallowable costs.

122. Review/approve contractor's requests for assignment of contract payments.

123. Review/approve or disapprove withholding of payments and/or retainages.

124. Determine and issue demand letters for collection of contractor's indebtedness.

125. Review and approve or disapprove the contractor's requests for payments under the progress payments clause.

126. Determine whether to suspend or reduce progress payments or initiate an alternate liquidation rate.

127. Review and approve or disapprove requests for cost sharing or matching payments.

128. Perform contract closeouts.

129. Determine adequacy of contractor accounting systems and take measures to protect the government's interests when accounting systems are determined to be inadequate.

130. Review and negotiate improvements in contractor estimating systems.

131. Monitor the contractor's financial condition to determine when it jeopardizes contract performance.

132. Obtain cost accounting standards disclosure information or statements.

133. Review cost accounting standards disclosure statements.

134. Negotiate price (cost impact) adjustments and execute supplementary agreements under cost accounting standards.

135. Identify defective pricing cases.

136. Demand and negotiate refunds for defective pricing.

137. Analyze claims and recommend settlement positions; prepare findings of facts.

138. Negotiate claim settlements with contractors.

139. Issue contracting officer final decisions under disputes clause of contracts.

140. Prepare and assemble dispute or claims files for the General Counsel.

141. Participate in claims, disputes, or protest board or court proceedings.

142. Obtain contractor's release of claims.

143. Review and approve subcontracting plans for inclusion in the contract.

144. Evaluate and consent to proposed placements of subcontracts.

145. Coordinate with other personnel on property control matters.

146. Evaluate and approve requests for government-furnished property.

147. Evaluate requests for/authorize contractor acquisition or fabrication of special tooling.

148. Determine if contractor's use of government property conforms with contractual authorizations.

149. Determine rent or use fees for government property.

150. Assess contractors for losses or damages to government property.

151. Determine bonding requirements and include appropriate provisions or clauses in the solicitation.

152. Review bond or bid guarantees for completeness and adequacy; check "List of Acceptable Sureties."

153. Notify bonding agencies of contract status.

154. Negotiate with bonding companies prior to contract termination.

155. Prepare and execute surety takeover agreements.

156. Refer evidence on performance failings to debarment officials.

157. Refer evidence of fraud and other civil or criminal offenses to the Inspector General and other responsible parties.

Additional procurement tasks identified by the ACE II Study Group which were selected by the researcher and included in this study [Ref. 14:2-C-2-17]:

1102-017-039A. Apply Buy American Act evaluation criteria.

1102-029-075B. Order performance under the Defense Priorities Allocation System.

1102-039-107B. Apply the Defense Priorities Allocation System to expedite performance.

1102-048-145. Review and approve contractor's property control system.

1102-052-159. Use small purchase procedures.

1102-053-160. Conduct foreign military sales.

1102-055-162. Prepare agency procurement requests for the delegation of authority from GSA for ADPE and related services.

1102-055-163. Review and determine the applicability of existing delegations of authority.

1102-055-164. Request funds from ADPE revolving funds.

1102-055-165. Review or evaluate utilization of ADPE prior to procurement.

1102-055-166. Use government-wide contractual resources for ADPE (e.g., GSA office of technology plus; GSA contracts for support services).

1102-055-167. Review and approve software licensing agreements.

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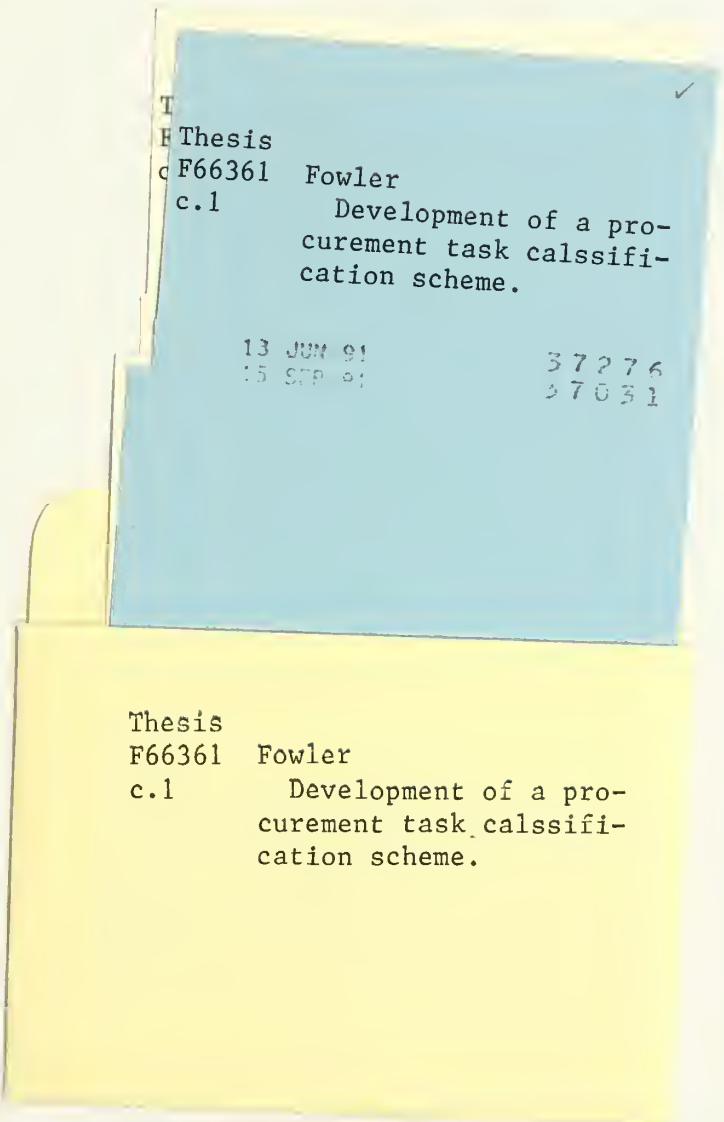

Thesis
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c.1 Development of a procurement task calssification scheme.